I/WE CLAIM:

1. A method for optical imaging of a light scattering object, the method comprising steps of;

   i) injecting a pulse of light at an injection port into said object at a time t_o;

   ii) collecting, at a collection port, light from said object to provide an optical signal based temporal point spread function (TPSF); and

   iii) detecting one or more selected time-gates of said TPSF to provide information to be used in producing an optical image of said light scattering object.

2. The method as claimed in claim 1 wherein said light from said object is collected at two or more locations to provide a plurality of optical signal based TPSF's; wherein desired temporal delays are introduced in propagation of the optical signals to produce time-delayed TPSF's and wherein each of said selected time-gates is obtained from a different time-delayed TPSF and wherein all of said selected time-gates are simultaneously detected.

3. The method as claimed in claim 2 wherein said two or more locations are proximal and said TPSF's are substantially identical.

4. The method as claimed in claim 3 wherein said time-gates span a time interval defined by an initial time and a final time which are set relative to t_o.

5. The method as claimed in claim 4 wherein said selected time gates are used for a plurality of injection port/object/detector port geometries.

6. The method as claimed in claim 5 wherein said time-gates are selected based on one or more optical properties of said object.

7. The method as claimed in claim 5 wherein said initial time and said final time of said selected time-gates are estimated based on one or more optical properties of said object that influence propagation of said light within said object.

8. The method according to claim 7 wherein said one or more properties comprise thickness of said object.

9. The method as claimed in claim 1 wherein said selection of said time-gates comprises:

i) obtaining at least a first derivative of said TPSF; and

ii) identifying one or more time interval of said TPSF in which said at least first derivative is zero at a point in said time interval thereby effecting said selection of said time-gates.

10. The method as claimed in claim 9 wherein at least a first derivative of two or more TPSF are obtained and wherein said selected time-gates comprise selected time-gates from each of said two or more TPSF.

11. The method as claimed in claim 10 wherein said selected time-gates are further selected based on an order of said derivative.

12. The method as claimed in claim 1 wherein said selection of said time-gates comprises:

i) obtaining one or more TPSF for each of a plurality of light scattering objects;

ii) obtaining at least a first derivative of said TPSF;

iii) identifying one or more time interval of said TPSF in which said at least first derivative is zero at a point in said time interval thereby effecting said selection of said time-gates;

iv) retrievably storing said selected time-gates such that said selected time-gates are associated with at least one predetermined characteristic of a corresponding object; and

v) matching a characteristic of a new object to be imaged with said stored predetermined characteristics to identify corresponding selected time-gates to be used in imaging said new object.

13. The method as claimed in claim 1 wherein said step of detecting is performed using a time-gated detector.

14. The method as claimed in claim 13 wherein the time-gated detector is an ICCD camera.

15. The method as claimed in claim 2 wherein the two or more time-gates are simultaneously detected at two or

more time-gated detectors having a synchronized acquisition time gate.

16. The method as claimed in claim 15 wherein the step of simultaneously detecting comprises detecting said selected time-gates using a time-gated detector comprising a 2-dimensional array of pixels.

17. The method as claimed in any one of claim 16 wherein the time-gated detector is an ICCD camera.

18. The method as claimed in claim 1 wherein the collecting of the light is achieved by providing one or more optical fibers.

19. The method as claimed in claim 18 further comprising adjusting fibers' length to introduce the desired delays.

20. The method as claimed in claim 19 wherein the fibers are grouped together into one or more bundles.

21. The method according to claim 20 wherein each fiber in the one or more bundles is directed to a distinct detection position of the time-gated detector or to a distinct time-gated detector.

22. The method as claimed in claim 21 wherein the one or more bundles are spatially localized such as to collect light from one or more desired areas of said object.

23. The method as claimed in claim 22 wherein the one or more bundles are coupled to one or more time-gated detectors.

24. A system for optical imaging of a light scattering object the system comprising:

i) at least one light injection port;

ii) light collecting means to collect light from said object at one or more locations to provide one or more optical signal based temporal point spread functions; and

iii) one or more time-gated detectors.

25. The system according to claim 24 further comprising means for introducing temporal delays in propagation of said optical signals.

26. The system as claimed in claim 25 wherein the light collecting means are optical fibers.

27. The system as claimed in claim 26 wherein the optical fibers are also the means to delay the propagation of the optical signals whereby the delay is provided by having optical fibers of different lengths.